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Total Number of Pages in This Submission

Application Number 10/759,651

Filing Date January 16, 2004

First Named Inventor Jaap de Baan, et al

Art Unit 3617

Examiner Name Jesus D. Sotelo

Attorney Docket Number 12522.0102

ENCLOSURES (Check all that apply)

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Appellant's Reply to Examiner's Answer
Applicants: De Baan, Uittenbogaard, Coulomb
Attorney Docket No.: 12522.0102

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application/Serial No. : 10/759,651
Applicants : Jaap de Baan
Ries Uittenbogaard
Louis Coulomb
Application Filing Date : January 16, 2004
Title : CATENARY ANCHOR LEG MOORING SYSTEM
TC/A.U. : 3617
Examiner : Jesus D. Sotelo
Docket No. : 12522.0102

TO: Commissioner for Patents
P.O. Box 1450
Alexandra, VA 22313-1450

APPELLANT'S REPLY BRIEF
UNDER 37 C.F.R. 41.41

In response to the Examiner's Answer under 37 C.F.R. 41.39 dated June 22, 2007, Appellant submits the following Reply Brief under 37 C.F.R. 41.41 and MPEP 1208.

The foregoing heading shall serve as the required identification page setting forth the appellants' names, the application number, the filing date of the application, title of the invention, the name of the Examiner, the art unit of the Examiner and the title of this paper.

Status of Claims

Appellant and Examiner concur that the status of the Claims as stated in the Appeal Brief is correct.

Grounds of Rejection to be Reviewed on Appeal

Appellant and Examiner concur that the grounds of Rejection to be Reviewed on Appeal as stated in the Appeal Brief are correct.

Argument Pages

The Appellant disagrees with the conclusion reached in paragraph (10) Response to Argument of the Examiner's Answer. The following Argument Pages addressing the 35 USC 102 Novelty rejection and the 35 USC 103 Obviousness rejection are submitted in response to the points raised in paragraph (10) Response to Argument of the Examiner's Answer.

It is also to be noted that since the filing the Appeal Brief the U.S. Supreme Court has provided further guidance regarding the combination of references to reject pending claims for obviousness in *KSR v. Teleflex*. Accordingly, since the rejection of the pending claims now being appealed included a 35 USC 103 Obviousness rejection, that section of the following Argument Pages addressing the 35 USC 103 Obviousness rejection is organized according to the analysis format suggested by the U.S. Supreme Court in *Graham v. Deere*.

Appellant's Reply Argument – 35 USC 102 (Novelty) Rejection

The Examiner has properly stated his ground for the rejection of pending Claim 1 in the Examiner's Answer.

Appellant's reply thereto is described in the simplest terms in the following two paragraphs for the purpose of focusing the issue regarding 35 USC 102 Novelty for the Board of Patent Appeals and Interferences.

U.S. Patent No. 5,431,589 to Corona teaches a complex buoy apparatus in which the overall effect is that of a submarine. When the buoy described in US Patent No. 5,431,589 finds itself in trouble because of wind and wave forces on the sea surface a dive command is sent. The dive command initiates a dive response. Valves are opened, ballast compartments are filled and the catenary anchor leg mooring buoy removes itself from severe wind and wave forces by retreating to a world under the waves. When the wind and wave forces no longer pose a threat to the buoy and its operation a surfacing sequence is ordered and the buoy returns itself to a world of calmer wind and wave forces.

The buoy described in the claims now under appeal is not a submarine. There is no provision in the claimed invention for initialing a dive sequence nor is there any provision for initializing a surfacing sequence. Rather than retreating to a world away from wind and wave forces by submerging, the non-submersible catenary anchor leg mooring buoy described in the claims now under appeal meets the wind and wave forces by being constructed and arranged to have an anti-pitch, anti-roll design.

Appellant's Reply Argument – 35 USC 103 (Obviousness Rejection)

As previously indicated, the following argument addressing the application of the patentability standard of non-obviousness to the rejection of the claims under appeal follows the format suggested by the *Graham v. Deere* opinion of the U.S. Supreme Court.

Scope and Content of the Prior Art As A Whole

As indicated in the Examiner's Answer U.S. Patent 5,431,589 to Corona (the primary reference) teaches a catenary leg mooring system which includes a floating hollow buoy 16 having a cylindrical hull portion which has a center of gravity below the sea surface; ballast compartments 90 having a portion below the sea surface and means for providing a path for the oil to travel up to the sea surface from subsea reservoirs.

The problem with the description of the teachings of U.S. Patent 5,431,589 in the foregoing paragraph from the Examiner's Answer is that the foregoing description is incomplete. A close reading of U.S. Patent 5,431,589 to Corona will reveal that its specification teaches a whole lot more about the ballasting system located on-board the catenary anchor leg mooring buoy. This whole lot more is that the ballast compartments are active ballast compartments. That is, the active ballast compartments described in U.S. Patent 5,431,589 to Corona are part of a system which either fills or empties the ballast compartments by use of automatic valves and power driven pumps in response to a need to take the buoy out of the path of destabilizing wind and wave forces on the sea surface. It is a well established principle that when a prior patent is reviewed, that prior patent must be reviewed in its entirety, to include those portions which lead away from the invention being considered. *Panduit v. Dennison*, 810 F.2d 1561, 1 USPQ2d

1593 (Fed. Cir. 1987). In the Obviousness rejection of the claim now under appeal and in the Examiner's Answer, the essential submersible aspect of the buoy described in U.S. Patent 5,431,589 was not considered.

Stability of a catenary anchor leg mooring buoy is a critically important feature; such stability is critical when the catenary anchor leg mooring buoy is located offshore and is attached to flow lines coming from oil reservoirs at the ocean bottom to the ocean surface. In calm waters not much ballast is needed to keep a catenary anchor leg mooring buoy stable. But, as the forces of wind and waves increase to a level where they disturb the ocean surface, U.S. Patent 5,431,589 teaches that there is a limit as to what an on board ballast system that is effective in calm water can do to stabilize a catenary anchor leg mooring buoy in rough waters. Specifically, U.S. Patent 5,431,589 teaches that the catenary anchor leg mooring buoy must be moved to a location away from the destabilizing effect of wind and waves and only returned to its previous location after wind and wave forces have subsided.

Hypothetically, there are two choices available for buoy movement if the buoy is to remain attached to the flow lines. The first choice is to move the buoy upwardly out of the water. However, without a lifting or hovercraft type mechanism affixed permanently to the buoy, moving the buoy upwardly out of the water is an impossible solution. The second choice is to move the buoy downwardly into that section of ocean waters below the top layer of the ocean waters affected by the disturbing forces of wind and waves. Then, after the forces of wind and waves have subsided, the buoy is returned again to the surface of the ocean waters to return to normal operation.

Cited as a secondary reference is U.S. Patent 4,501,525 to Grundy et al. for the teaching that buoy may be formed having a configuration with a diameter which is greater than twice the height of the buoy.

While it was argued in the Appellant's response to the Office Actions and in the Appeal Brief that U.S. Patent 5,431,589 to Corona and U.S. Patent 5,501,525 to Grundy et al. were not combinable, the recent holding of the U.S. Supreme Court in *KSR v. Teleflex* has effectively diminished the strength of that argument. Accordingly, if *arguendo*, U.S. Patent 5,431,589 to Corona and U.S. Patent No. 4,501,525 were combined, the question then becomes what is the scope and content of the prior art as a whole if that prior art is the combination of U.S. Patent 5,431,589 to Corona and U.S. Patent 4,501,525 to Grundy et al.

The answer to the question posed in the foregoing paragraph is that the scope and content of the prior art as a whole is a buoy having a diameter greater than twice its height with an active ballast system. Such active ballast system has the ability to initiate a dive sequence during high levels of wind and wave forces and a surfacing sequence when the forces of wind and waves have subsided.

Simply put, the scope and content prior art as a whole teaches that the solution to the problem of dealing with wind and wave forces is to move a buoy having a diameter greater than twice its height to a location where the buoy is out of the path of the wind and wind forces beneath that portion of the sea surface affected by wind and wave forces. Then, when the wind and wave forces are gone, to return the catenary anchor leg mooring buoy to its position on the sea surface for normal operation.

Differences Between the Scope and Content of the Prior Art As A Whole and the Invention As Claimed.

The invention as claimed does not have an active ballast system. The invention as claimed is not a submarine. The invention as claimed does not have a dive sequence nor does the invention as claimed have a surfacing sequence.

In the first element of the independent claim which is the subject of this appeal the following words are used (emphasis added):

“a *non-submersible* hollow buoy assembly for *continuous floatation* on the sea surface;”

Further, no active ballast system is described anywhere in the referenced independent claim. Rather, in the independent claim under appeal, the ballast compartment is described as having only two features – neither of which may be considered active as follows (emphasis added):

“a cylindrical hull portion further including a ballast compartment *having a portion below the sea surface;*”

“said ballast compartment being constructed and arranged to adjust the natural pitch and roll periods of said non-submersible buoy assembly *to reduce pitch and roll* in response to wind and wave forces;”

The difference herein is that in a system for stabilizing a floating catenary anchor leg mooring buoy used in the production of oil from subsea reservoirs, the buoy need NOT include all of the complex mechanisms and systems which cause a submersible buoy to move downwardly -- away from the sea surface -- or upwardly – back toward the sea surface. As indicated above, the scope and content of the prior art teaches that meeting the problem of

destabilizing disturbances is to move away from the troubles of one world into another world much like the Beatles did in their "Yellow Submarine." This other world is the only available location where the wind and wave forces do not exist; that is, under the sea surface.

The teaching of the present invention is that for a buoy used in the production of oil from subsea reservoirs the forces of wind and waves need not be avoided; rather, they can be confronted with a properly designed ballast compartment within the catenary anchor leg mooring buoy assembly which is sufficient to reduce the pitch and roll in response to anticipated wind and wave forces.

Simply stated, the difference between the scope and content of the prior art as a whole and the invention as claimed centers on how the two inventions deal with severe wind and wave forces. The prior art teaches that the solution to the problem of dealing with severe wind and wave forces is to avoid the wind and wave forces with a complex electromechanical active ballast system. The invention as described in the claims being appealed teaches that the solution to the problem of dealing with wind and wave forces is not to move away from the problem but rather to confront the wind and wave forces with a solely mechanical inactive ballasting system designed to reduce the anticipated pitch and roll of the catenary anchor leg mooring buoy resulting from the forces of wind and waves.

Obviousness of the Differences Between the Scope and Content of the Prior Art As A Whole and the Invention As Claimed to a Person of Ordinary Skill In The Art

Determining who is a person of ordinary skill in the art is always one of the more difficult determinations in a *Graham v. Deere* analysis. However, a good place to start is with another inventor who confronted exactly the same problem perceived by the named inventors. Fortunately, such an inventor appears in the prosecution history of the instant application. This inventor is Mr. Emilio Corona. Mr. Corona's complex solution to the problem associated with bringing oil to the sea surface from subsea reservoirs is taught in US Patent No. 5,431,589. The problem confronting Mr. Corona was a difficult one because of the sheer physical size of the equipment used in the production of oil from subsea reserves and the large forces on that large equipment resulting from wind and wave action.

The lack of older prior art indicates that Mr. Corona was one of the first to appreciate the need for a system which would stabilize an offshore catenary anchor leg mooring buoy used for the production of oil from subsea reservoirs in the face of wind and wave forces. And, as often happens with inventors new to a heretofore unsolved problem, a complex solution was presented. The complex solution presented by Mr. Corona revealed that Mr. Corona saw that the solution to the problem of stabilizing a catenary anchor leg mooring buoy meant having to create a stabilization system which could function in two worlds. The first world was the world of calm seas. The second world was that of rough seas where the forces of wind and waves would overwhelm the inherent resistance of the buoy to movement and thereby cause a de-stabilizing situation. Accordingly, the teachings of US Patent No. 5,431,589 are directed to a two part system that enables operation in both the world of calm seas and in the world of rough seas.

In Mr. Corona's first world of calm seas, the inherent stability of a large buoy allows the buoy to operate for the function intended. But in Mr. Corona's second world of rough seas, Mr. Corona saw this as a place where the calm sea solution would not work; therefore, the second world was to be avoided. Such avoidance is accomplished by moving away from the problem of rough seas to a place of relative safety – beneath the rough seas -- until the problem of rough seas goes away.

In the invention as claimed, the inventors named in the instant application do not see stability of a catenary anchor leg mooring buoy as a two-world problem. Rather, the inventors named in the instant application see one problem on the sea surface. They discovered that this one problem can be met by a ballast system whose inherent anti-pitch and anti-roll characteristics are adequate to confront the forces of even rough seas. Accordingly, the inventors herein discovered that a ballast system with sufficient anti-pitch and anti-roll characteristics to meet rough seas can be made part of the structure of the catenary anchor leg mooring buoy.

Mr. Corona taught that the problem of dealing with the two states of calm seas and rough seas required a two part solution. In calm seas the mechanical design of the buoy would be sufficient, but in rough seas a more complex solution was required. That more complex solution was to escape the rough seas. There is nothing in the prior art to show that a single mechanical solution to the problem of rough seas affecting a catenary anchor leg mooring buoy is at all possible; rather, the Corona 589 references teaches away from an exclusively mechanical solution.

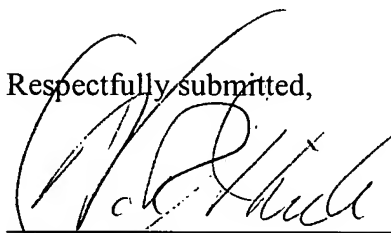
The inventors who discovered the claimed invention also perceived that calm seas can become rough seas; all that was needed was a single design solution. Specifically, a complex

system to avoid rough seas was not necessary if a catenary anchor leg mooring buoy was designed to encounter, by its structural design, the anticipated pitch and roll from wind and wave forces.

In sum, the prior art teaches away from the claimed invention because the prior art teaches that the solution is to move away from the problem of rough seas. This prior art solution is enabled by a complex active ballast system which turns the catenary anchor leg mooring buoy into an un-manned submarine. In the instant application, the named inventors determined that moving away from the problem of rough seas is not required. Instead, the named inventors realized that an effective solution to the problem did not require the complexity of creating an un-manned submarine; but discovered instead that the problem of rough seas could be dealt with by a robust catenary anchor leg mooring buoy design which could confront rather than avoid the destabilizing problems caused by wind and wave forces.

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Respectfully submitted,



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